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EXAMINER	
HANOR, SERENA L	

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1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,718	HUSSAIN ET AL.	
	Examiner	Art Unit	
	SERENA L. HANOR	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-61* is/are rejected.

7)☒ Claim(s) *7 and 43* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :03/19/2007, 11/28/2007, 08/01/2008.

DETAILED ACTION

Claim Objections

Claims 7 and 43 are objected to because of the following informalities: lanthanum is a lanthanide metal.

Appropriate correction is required.

Claim Rejections - 35 USC § 112, 2nd

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9, 15, 16, 18, 34, 45, 46 and 52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

i. Claim 9 recites the limitation "the rare earth metal oxide" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

ii. Claim 15 recites the range as being 0.5-2%. However, claim 15 is dependent upon claim 12, which recites a range of 1-10%. The range of claim 15 does not further limit the range of claim 12.

iii. Claim16 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: whether the transition metal aluminate as recited in claim 1 comprises a transition metal alumina and a transition metal aluminate as recited in claim 16. Currently, the limitation of claim 16 could be interpreted to mean that the supported catalyst comprises transition metal

oxide, transition metal aluminate, and transition metal alumina/aluminate. For the purposes of this action, examiner will assume the transition metal aluminate of claim 1 comprises a transition metal alumina and a transition metal aluminate, as per claim 16.

iv. The terms "transition metal oxide-rare earth metal", "metal-aluminate", "metal oxide-rare earth metal-aluminate", "oxide-aluminate", "metal-alumina", "metal oxide-rare earth metal-alumina", and "oxide-alumina" in claim 18 are relative terms which render the claim indefinite. The terms " transition metal oxide-rare earth metal", "metal-aluminate", "metal oxide-rare earth metal-aluminate", "oxide-aluminate", "metal-alumina", "metal oxide-rare earth metal-alumina", and "oxide-alumina" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. These terms are not common terms in the art.

v. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "metal salt" in claim 34 is used by the claim to mean "metal oxide", while a metal oxide is not a metal salt. The term is indefinite because the specification does not clearly redefine the term.

vi. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine

the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "metal salt" in claim 45 is used by the claim to mean "metal oxide" or "metal hydroxide", while neither a metal oxide nor a metal hydroxide are metal salts. The term is indefinite because the specification does not clearly redefine the term.

vii. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "lanthanum oxide" in claim 46 is used by the claim to mean "rare earth metal salt", while lanthanum oxide is not a rare earth metal salt. The term is indefinite because the specification does not clearly redefine the term.

viii. Claim 52 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: what is 1-20% by weight of the catalyst support.

Specification

The disclosure is objected to because of the following informalities: all corresponding terms as listed in the rejections above.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

1. Claims 1-5, 19, 20, 56, 58 and 60 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Aldridge (U.S. Patent No. 4,456,703).

Aldridge discloses a supported catalyst with a surface of 10-500 m^2/g, preferably 140-150 m^2/g (col. 1 line 50-col. 2 line 4, col. 2 lines 34-40, *Applicants' claims 19 and 20*) comprising:

a) nickel oxide (col. 2 lines 61-68, *Applicants' claims 2 and 3*), which is 23% by weight of the supported catalyst (col. 6 lines 22-27, *Applicants' claim 5*);

b) nickel aluminate (col. 1 lines 46-65, col. 2 lines 29-34, *Applicants' claim 1*), which is 5-100% by weight of the supported catalyst (col. 2 lines 29-34, *Applicants' claim 4*);

The catalyst may be used for a steam reforming reaction and an autothermal reaction (col. 3 lines 1-6, *Applicants' claims 56, 58 and 60*).

Aldridge discloses a nickel aluminate content that overlaps and/or lies within the instantly claimed ranges.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have produced** a catalyst with a nickel aluminate content within the instantly claimed range, as per Applicants' claim 4, **because** a *prima facie* case of obviousness exists in

the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5].

Aldridge discloses a nickel oxide content that overlaps and/or lies within the instantly claimed range.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have produced** a catalyst with a nickel oxide content within the instantly claimed range, as per Applicants' claim 5, **because** a *prima facie* case of obviousness exists in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5].

2. Claims 1-17, 21-24, 56 and 61 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sambrook et al. (CA 2359940 A1).

Sambrook et al. disclose a reduced (p. 1 lines 18-19, *Applicants' claim 61*) supported comprising:

a) nickel oxide (p. 1 lines 20-25, *Applicants' claims 2 and 3*), which is 10-90% by weight of the supported catalyst, preferably 10-80% by weight, more preferably 15-30% by weight (p. 1 lines 38-39, *Applicants' claims 5, 11, 14 and 23*);

b) nickel aluminate (p. 2 lines 2-12, *Applicants' claim 1*), which is a mixture of a transition metal alumina and a transition metal aluminate with a ratio of alumina:aluminate of 1:1-4, which is 10-90% by weight of the supported catalyst, preferably 10-60% by weight, more preferably 30-50% by weight (p. 2 lines 2-16, *Applicants' claims 4, 10, 13, 16, 17 and 23*);

c) lanthanum oxide (p. 1 lines 20-25, *Applicants' claims 6-9*), which is1-10% by weight of the supported catalyst, more preferably 0.5-2% by weight (p. 1 line 39, *Applicants' claims 12, 15 and 23*); and

d) lanthanum aluminate (p. 2 lines 2-12, *Applicants' claims 22 and 24*).

Sambrook et al. do not disclose the presence of nickel and lanthanum aluminate.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have expected** the catalyst of Sambrook et al. to comprise nickel and lanthanum aluminate, as per Applicants' claims 1, 2, 4, 10, 13, 16-18 and 22, **because** alumina is present in intimate admixture with the nickel or nickel oxide and lanthanum oxide, in addition to any alumina in the carrier material (p. 2 lines 2-8), and "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3] I.

Sambrook et al. do not specifically disclose the ratio of transition metal alumina:transition metal aluminate as 1:1-4.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have known** that nickel alumina and aluminate would be present in a ratio within the instantly claimed range, as per Applicants' claim 17, **because** alumina is present in intimate admixture with the nickel or nickel oxide and lanthanum oxide, in addition to any alumina in the carrier material (p. 2 lines 2-8), and "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3] I. Furthermore, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Sambrook et al. do not disclose the supported catalyst as having peaks in a powder x-ray diffraction pattern.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have expected** the supported catalyst of Sambrook et al. to have the same peaks as the instant invention, as per Applicants' claim 21, **because** "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific

explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3] I.

3. Claims 25-51, 53-55, 57 and 59 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sambrook et al. (U.S. Patent No. 4,469,815) in view of Durand et al. (U.S. Patent No. 5,736,482).

Sambrook et al. disclose a process for making a supported catalyst comprising:

i. combining nickel nitrate or carbonate (col. 1 lines 24-25, col. 2 lines 47-68, *Applicants' claims 33-36*), a catalyst support optionally containing a promoter such as lanthanum, wherein the lanthanum precursor is a nitrate or a carbonate which becomes lanthanum oxide upon calcination (col. 2 lines 25-36 and 47-68, *Applicants' claims 42-46*), and an acid material to form a slurry;

ii. adjusting the slurry to a pH of 7-8 by adding ammonium hydroxide or a metal hydroxide (col. 1 line 64-col. 2 line 1, *Applicants' claims 31 and 50*) and heating the slurry (col. 3-4 Example 1, *Applicants' claim 32*);

iii. recovering the supported catalyst from the slurry (col. 2 lines 7-8 and 47-68, col. 3 lines 19-21, col. 3-4 Example 1, *Applicants' claim 25*);

iv. calcining the supported catalyst in the presence of an oxidizing gas (col. 1 lines 26-27, col. 2 lines 11-14 and 47-68, col. 4 lines 23-24, *Applicants' claims 27 and 30*), wherein the catalyst support has an apparent porosity of 15-80%, a mean pore diameter of 0.05-20 microns, is a ceramic, silica or alumina (col. 3 lines 10-18, *Applicants' claims 37-41*), wherein the catalytic active component is 20-80% by weight and the catalyst

support optionally containing promoter is 20-80% by weight based on the total combined weight of the mixture (col. 3 lines 1-9, *Applicants' claim 51*); and

v. reducing the supported catalyst (col. 1 line 29, *Applicants' claim 53*) using hydrogen (col. 4 lines 24-30, *Applicants' claim 54*).

The catalyst may used for autothermal reforming reactions and steam reforming reactions, wherein the promoter is present (col. 1 lines 4-8, col. 2 lines 37-47, *Applicants' claims 55, 57 and 59*).

Sambrook et al. disclose a process for making a supported catalyst comprising:

i. dispersing a catalytic active component with the pores of a catalyst support, which is treated with an acid material (col. 3 lines 19-21, *Applicants' claim 48*), wherein the catalyst optionally contains a promoter therein; and

ii. converting the catalytic active component to an active metal complex intermediate at a pH of 7-8, preferably about 7.5 (col. 4 lines 4-5, *Applicants' claim 49*), the active metal complex intermediate coating surfaces of the catalyst support (col. 2 lines 28-32, col. 2 lines 47-68, *Applicants' claim 26*).

Sambrook et al. disclose the pH as remaining at approximately 7.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have known** that a pH of approximately 7 could mean 7.5 or possibly even 8, as per Applicants' claims 25, 26 and 49, **because** a *prima facie* case of obviousness exists in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference

that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5].

Sambrook et al. disclose a catalytic active component and catalyst support content that overlap and/or lie with the instantly claimed ranges.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have produced** a catalyst with a catalytic active component and catalyst support content within the instantly claimed ranges, as per Applicants' claim 51, **because** a *prima facie* case of obviousness exists in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5].

Sambrook et al. do not disclose pretreating the support with nitric acid.

Durand et al. disclose pretreating an alumina support with nitric acid and mixing it with lanthanum and nickel nitrate (col. 4 line 65-col. 5 line 4, Examples 1 and 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention **to have modified** the process of Sambrook et al. by using nitric acid as nitric acid, as per Durand et al., as per Applicants' claim 47, **because** "[e]xpress suggestion to substitute one equivalent for another need not be present to render such substitution

obvious." *In re Fout*, 675 F.2d 301, 213 USPQ 532 (CCPA 1982). See MPEP 2143 B Example 1. Furthermore, Sambrook et al. disclose treating the support with acid in order to modify the interaction of the catalytic active material and the support.

Sambrook et al. disclose a lower calcination temperature.

Durand et al. disclose a calcination temperature of 1000C (col. 4 lines 18-21) or 650-900C (col. 5 lines 43-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention **to have modified** the process of Sambrook et al. by increasing the calcination temperature to within the claimed range, as per Durand et al., as per Applicants' claims 28 and 29, **because** a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

4. Claims 1-19, 21-24, 56, 58, 60 and 61 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chu et al. (Partial oxidation of methane to carbon monoxide and hydrogen over $NiO/La_2O_3/gamma\text{-}Al_2O_3$ catalyst) in view of (Cheng et al., Effects of promoters and

preparation procedures on reforming of methane with carbon dioxide over Ni/Al_2O_3 catalyst).

Chu et al. disclose a reduced supported catalyst with a surface of 10-500 m^2/g (p. 69, *Applicants' claims 19 and 61*) comprising:

a) nickel oxide (p. 69, *Applicants' claims 2 and 3*), which is 10-17.5% by weight of the supported catalyst (p. 71 Table 2, *Applicants' claims 5, 11, 14 and 23*);

b) nickel aluminate, which is a mixture of nickel alumina and nickel aluminate (p. 78, *Applicants' claims 1, 13-16, 18 and 23*),

c) lanthanum oxide (p. 69, *Applicants' claims 6-9*), which is 0.5-5.0% by weight of the supported catalyst (p. 71 Table 2, *Applicants' claims 12, 15 and 23*).

The supported catalyst comprises peaks in the powder x-ray diffraction pattern having the following 2Θ± values: 19.1° (± 0.2), 31.5° (± 0.2), 37.1° (± 0.2), 45.0° (± 0.2), 59.7° (± 0.2), and 65.8° (± 0.2) (p. 75 Figure 5, *Applicants' claim 21*).

The catalyst may be used for a steam reforming reaction and an autothermal reaction (Abstract, p. 67, *Applicants' claims 56, 58 and 60*).

Chu et al. do not specifically disclose the presence of lanthanum aluminate.

Cheng et al. disclose that when a gamma-alumina support is impregnated with Ni(II) ions (i.e. nickel nitrate) and heated to a temperature of about 600°C, two reactions occur concurrently on the alumina surface; one produces a "surface spinel" somewhat like NiAl2O4 and the other gives segregation of free nickel oxide. Similarly, a cation promoter such as La(III) could also interact with alumina during a thermic treatment of the sample containing such metal nitrates, since metal oxide formed from

decomposition has basic properties and will react with the acidic hydroxyl groups on alumina surface to produce a surface compound (p. 151, *Applicants' claims 22-24*).

It would have been obvious to one of ordinary skill in the art at the time of the invention **to have known** that the catalyst of Chu et al. would contain lanthanum aluminate, as per Cheng et al., as per Applicants' claims 22-24, **because** the calcination temperature is 750°C, which is close to that of Cheng et al., which means that lanthanum aluminate would be formed.

Chu et al. disclose a nickel oxide content, a lanthanum oxide, a catalytic active component content, and by Cheng et al. a nickel aluminate, nickel alumina, and a lanthanum aluminate content, that overlap and/or lie within the instantly claimed ranges.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have produced** a catalyst with component contents within the instantly claimed ranges, as per Applicants' claims 4, 5, 10-15, 17 and 23, **because** a *prima facie* case of obviousness exists in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5]. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions

of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Chu et al. disclose XRD patterns, wherein one pattern (f) (p. 75 Figure 5) has peaks at about 19, 31, 37, 45, 60 and 66. However, the graph stops at 70, so the appearance of peaks at 76, 80 and 83 is unknown.

It would have been obvious to one of ordinary skill in the art at the time of the invention **to have expected** the XRD pattern of Chu et al. to have peaks at 76, 80 and 83 if the graph continued past 70, as per Applicants' claim 21, **because** the supported catalyst of Chu et al. has peaks at the same points as the instant supported catalyst up to as far as the x-axis of the graph of Chu et al. extends. Therefore, is the x-axis encompassed a ranger of up to 80, the supported catalyst of Chu et al. would reasonably have the same peaks as the instant catalyst.

Conclusion

Claims 1-61 have been rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SERENA L. HANOR whose telephone number is (571)270-3593. The examiner can normally be reached on Monday - Thursday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SLH

/Timothy C Vanoy/
Primary Examiner, Art Unit 1793